IN THE DRAWINGS:

Please enter the attached corrected drawings Figs. 4A-B, in which the drawings are being swapped, to replace Figs. 4A-B as originally filed. A Letter to Draftsperson is also submitted herewith.

REMARKS

The above amendments to the above-captioned application along with the following remarks are being submitted as a full and complete response to the Official Action dated March 8, 2006. In view of the above amendments and the following remarks, the Examiner is respectfully requested to give due consideration to this application, to indicate the allowability of the claims, and to pass this case to issue.

Status of the Claims

Claims 2-6, 9-10 and 12 are under consideration in this application. Claims 1, 7-8 and 11 are being cancelled without prejudice or disclaimer. Claims 2-3, 6, 9-10 and 12 are being amended, as set forth in the above marked-up presentation of the claim amendments, in order to more particularly define and distinctly claim Applicants' invention.

The drawings and the claims are being amended to correct formal errors and/or to better recite or describe the features of the present invention as claimed. All the amendments to the claims are supported by the specification, especially Figs. 1-2. Applicants hereby submit that no new matter is being introduced into the application through the submission of this response.

Prior Art Rejections

Claims 1-4 and 8 were rejected under 35 U.S.C. § 102(b) as being anticipated by US Patent No. 6,512,504 to Yamauchi et al (hereinafter "Yamauchi"). Under 35 U.S.C. § 103(a), claims 5 and 6 were rejected as being unpatentable over Yamauchi in view of in view of US Patent No. 6,521,247 to Suzuki et al. (hereinafter "Suzuki"), US Patent No. 6,335,555 to Takemura (hereinafter "Takemura"), US Patent No. 6,479,837 to Ogawa (hereinafter "Ogawa"), US Pat. App. Pub. No. 2003/0160239 of Shinigawa et al. (hereinafter "Shinigawa"), claims 9 and 11 were rejected over Suzuki, Takemura, Ogawa, and Shinigawa; claim 7 was rejected over Yamauchi in view of US Patent No. 6,509,940 to Kwak (hereinafter "Kwak"); claim 10 was rejected over Suzuki, Takemura, Ogawa, and Shinigawa, and in view of Kwak; and claim 12 was rejected over Suzuki, Takemura, Ogawa, and Shinigawa., and in view of US Patent No. 6,249,999 to Zhang (hereinafter "Zhang"). These rejections have been carefully considered, but are most respectfully traversed.

The image display device of the invention provided with an active-matrix substrate (for example, the embodiment depicted in Fig. 6, pp. 16-17), as now recited in all the

independent claims 2-3 and 6, comprises: an insulating substrate INS; and a plurality of circuit regions fabricated on said insulating substrate INS and including at least a pixel section and a pixel-driving circuit section, each of said pixel section and said pixel-driving circuit section having a polycrystalline silicon semiconductor film PSI. At least one of said plurality of circuit regions has a first type of a thin film transistor SWTR1 and a second type of a thin film transistor SWTR2. An angular orientation of a direction of a current flowing through a channel of said first type of a thin film transistor SWTR1 is formed to be non-parallel *with* an angular orientation of a direction of a current flowing through a channel of said second type of a thin film transistor SWTR2.

For example, a switch SW (Fig. 6) is provided in each pixel and formed of thin film transistors for retaining, discharging and storing charges. The elements constituting the pixel PXL are fabricated from the polycrystalline silicon film PSI converted from amorphous silicon by using excimer laser as explained in connection with FIGS. 3A(1) to 3A(2). No anisotropy is present in the polycrystalline silicon film PSI of FIGS. 3A(1) to 3B(2) and therefore, regardless of what the orientation of the layout of a thin film transistor is, there is little difference in characteristics of the thin film transistor. The switch SW of FIG. 6 has a double-gate structure comprised of two thin film transistors SWTR1 and SWTR2 so as to improve their ability to withstand voltages (p. 16, line 19 to p. 17, line 11). In this example, for the purpose of reducing an area of the layout of the two thin film transistors and improving the aperture ratio of the pixel, the angular orientation for aligning the source region and drain region of the thin film transistor SWTR1 is perpendicular to the angular orientation for aligning the source region and drain region of the thin film transistor SWTR2 in the layout as shown in FIG. 6. Another similar configuration in accordance with the present invention is also illustrated as the region RGN1 in FIG. 12.

Claim 2

The invention (for example, the embodiment depicted in Fig. 1) recited in claim 2 is directed to a plurality of circuit regions includes at least one pair of a first circuit region constituting a first circuit (e.g., a pixel circuit) and a second circuit region constituting a second circuit (e.g., a level shifter), ***all*** thin film transistors in said first circuit region flow current through channels thereof in a first angular orientation, ***all*** thin film transistors in said second circuit region flow current through channels thereof in a second angular orientation, and said first angular orientation is formed to be **non-parallel** with said second angular

orientation (See SKETCH 1, double-headed arrows indicate angular orientations of currents flowing through channels of TFTs.).

As another example, in FIG. 1 of the present application, while all the TFTs in the shift register DSR are arranged to flow current in an angular orientation parallel with the long sides of the glass substrate SUB, all the TFTs in the sampling switches SSW are arranged to flow current in an angular orientation perpendicular to the long sides of the glass substrate SUB.

In contrast, Fig. 2 of Yamauchi (SKETCH 2) has two different angular orientations of current flowing through TFTs in one circuit (e.g., a pixel circuit), rather than "angular orientations of currents flowing through TFTs in one circuit (e.g., a pixel circuit) are non-parallel with angular orientations of currents flowing through TFTs in another circuit (e.g., a level shifter)" as in the invention. In addition, Yamauchi has two different angular orientations of currents flowing through TFTs in one circuit, rather than one and only one angular orientation of current flowing through TFTs in one circuit.

Claim 3

The invention recited in claim 3 is directed to a plurality of circuit regions that includes at least one pair of a first-type circuit region constituting a first circuit and a second-type circuit region constituting a second circuit. All thin film transistors in said first-type circuit region flow current through channels thereof in one angular orientation, and angular orientations of currents flowing through channels of thin film transistors in said second-type circuit region are plural in number (SKETCH 3).

While the second-type circuit region recited in claim 3 is similar to the configuration of the circuit region disclosed in Fig. 2 of Yamauchi (SKETCH 2), the invention recited in claim 3 further includes the first-type circuit region in which all thin film transistors in the first-type circuit region flow currents through channels thereof in one angular (SKETCH 3). The configuration of such a first-type circuit region constituting a first circuit is absent form Yamauchi.

Furthermore, claim 3 includes the embodiments of more than one pair of the first-type and second-type circuit regions (for example, SKETCH 4 shown 3 pairs). Claim 4 recites a modification of the multiple pairs embodiments (for example, SKETCH 5 shown 3 pairs). Since the configuration of such a first-type circuit region constituting a first circuit is absent form Yamauchi, it fails to teach the multiple pairs embodiments encompassed by claim 3-4. The major differences between the multiple-pair embodiments of claim 3 and 4 is

that angular orientations of current flowing through channels of thin film transistors in different first-type circuit regions may be different from one another (SKETCH 4; claim 3), while in SKETCH 5 (claim 4), all first-type circuit regions share an identical angular orientation of current flowing through channels of thin film transistors.

Claim 6

The invention recited in claim 6 is directed to the thin film transistors of said first and second types are fabricated from polycrystalline silicon films having plural kinds of surface configurations, and said thin film transistors constituting at least one of said plurality of circuit regions are such that a peak-to-valley height difference of a surface of said channel, a source region and a drain region of said thin film transistors is equal to or smaller than 5 nm, and crystalline grains of said polycrystalline silicon film are of a rectangular shape of 0.3 μm to 2 μm in width and 4 μm or more in length.

Contrary to the Examiner's allegation (p. 3, last 2 lines and p. 4, 1st and 2nd paragraphs of the outstanding Office Action), applicants respectfully contend that a person of ordinary skill would not be motivated to either modify or combine the cited references in such a manner as to embody each and every feature of the present invention as now claimed. Applicants further contend that the combination of references used by the Examiner merely consists of selecting bits and pieces from each reference, and then combining those bits and pieces using knowledge or hindsight gleaned from the disclosure of the present invention as a guide to support the combination. The well established rule of law is that each prior art reference must be evaluated in its entirety, and that all of the prior art must be considered as a whole," *Panduit Corp. v. Dennison Mfg. Co.*, 227 USPQ 337, 344 (Fed. Cir. 1985). See *Para-Ordinance Mfg, Inc. v. SGS Importers Intl.*, Inc., 73 F.3d 1085, 37 USPQ2d 1237 (Fed. Cir. 1995) ("Obviousness may not be established using hindsight or in view of the teachings or suggestions of the inventor.").

Second, the invention recited in claim 6 requires specifically-shaped crystalline grains (a rectangular shape of 0.3-2 μm wide and $\geq$ 4 μm long) and a small peak-to-valley height difference ($\leq$5 nm).

A mere combination of the polycrystalline silicon films disclosed by Suzuki, Hagino, Ogawa and Shinigawa will not achieve TFTs having the high-breakdown-voltage, low-leakage performance disclosed by the present application. As admitted by the Examiner (p. 5, 3rd line of the last paragraph of the outstanding Office Action), none of them teaches rectangular-shaped crystalline grains of 0.3-2 μm wide and $\geq$ 4 μm long and a small peak-to-

valley height difference (≤5 nm). Even if, arguendo, a person of ordinary skill were motivated to combine the references as suggested by the Examiner, such combined teachings would still fall short in fully meeting the Applicants' claimed invention as set forth in claim 6.

The invention is intended to make the most of the polycrystalline silicon semiconductor film having crystalline grains of a rectangular shape of 0.3-2 μm in width and 4 μm or more in length. It is very important that the width of the crystalline grains is in a range of 2 μm or smaller and the crystalline grains are highly anisotropic. As shown in Fig. 5, there is a difference in TFT characteristics (mobility) by a factor of 2 or more. Since the grains have grain shapes as illustrated in Fig. 4, it is difficult to control the width of crystalline grains and the resulted anisotropy.

Typical high-quality crystalline grains derived from a combination of the above-cited patents constitute an even film composed of circular or elliptical grains of 2-5 μm in width and 3-5 μm in length. In this case, its anisotropy is low, and resulting grains are smoother and greatly different from the rectangular-shaped crystalline grains obtainable from the present invention. The features recited in claim 6 of the present application makes possible rectangular-shaped high-quality crystalline grains intended especially by the present invention. The combination of the above-cited references leads to smooth crystalline grains, but cannot not lead to or include the "rectangular-shaped" high-quality crystalline grains intended especially by the present invention.

Although the invention applies high-quality crystalline grains with overlapping ranges with the combination suggested by the Examiner, the invention applies rectangular-shaped crystalline grains to achieve unexpected results or properties. For example, to improve layout of the circuit. The presence of these unexpected properties is evidence of nonobviousness. MPEP§716.02(a).

> "*Presence of a property not possessed by the prior art is evidence of nonobviousness. In re Papesch, 315 F.2d 381, 137 USPQ 43 (CCPA 1963) (rejection of claims to compound structurally similar to the prior art compound was reversed because claimed compound unexpectedly possessed anti-inflammatory properties not possessed by the prior art compound); Ex parte Thumm, 132 USPQ 66 (Bd. App. 1961) (Appellant showed that the claimed range of ethylene diamine was effective for the purpose of producing " 'regenerated cellulose consisting substantially entirely of skin' " whereas the prior art warned "this compound has 'practically no effect.' ").*

Although "[t]*he submission of evidence that a new product possesses unexpected properties does not necessarily require a conclusion that the claimed invention is nonobvious. In re Payne, 606 F.2d 303, 203 USPQ 245 (CCPA 1979). See the discussion of latent properties and additional advantages in MPEP § 2145*," the unexpected properties were unknown and non-inherent functions in view of the prior art combination, since the prior art combination does not inherently achieve the same results. In other words, these advantages would not flow naturally from following the teachings of the prior art combination, since the prior art combination fails to suggest "crystalline grains of a rectangular shape of 0.3-2 μm in width and 4 μm or more in length".

Applicants further contend that the mere fact that one of skill in the art could rearrange the prior art to meet the terms of the claims is not by itself sufficient to support a finding of obviousness. The prior art must provide a motivation or reason for one skilled in the art to provide the unexpected properties, such as improving layout by reducing area size, without the benefit of appellant's specification, to make the necessary changes in the reference device. *Ex parte Chicago Rawhide Mfg. Co.*, 223 USPQ 351, 353 (Bd. Pat. App. & Inter. 1984). MPEP§2144.04 VI C.

Neither Yamauchi, Suzuki, Hagino, Ogawa and Shinigawa, nor their combinations teaches or suggests each and every feature of the present invention as recited in independent claims 2-3 and 6, from which other claims depend. As such, the present invention as now claimed is distinguishable and thereby allowable over the rejections raised in the Office Action. The withdrawal of the outstanding prior art rejections is in order, and is respectfully solicited.

Conclusion

In view of all the above, Applicants respectfully submit that certain clear and distinct differences as discussed exist between the present invention as now claimed and the prior art references upon which the rejections in the Office Action rely. These differences are more than sufficient that the present invention as now claimed would not have been anticipated nor rendered obvious given the prior art. Rather, the present invention as a whole is distinguishable, and thereby allowable over the prior art.

Favorable reconsideration of this application as amended is respectfully solicited. Should there be any outstanding issues requiring discussion that would further the prosecution and allowance of the above-captioned application, the Examiner is invited to

contact the Applicant's undersigned representative at the address and telephone number indicated below.

Respectfully submitted,

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